



Terraprobe

*Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing*

**GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
MEAFORD HIGHLANDS RESORT
3RD LINE, SOUTH OF HIGHWAY 26
MUNICIPALITY OF MEAFORD, ONTARIO**

Prepared For: Meaford A2A Developments Inc.
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Attention: Mr. Steve Warsh, President

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1.0 EXECUTIVE SUMMARY

Terraprobe was retained to provide preliminary geotechnical characterization of the site and to provide recommendations based on these findings to guide design decisions.

Terraprobe observed and recorded the advancement of twenty (20) sampled boreholes on the subject property. The boreholes generally indicated stiff to hard silt to clayey silt overburden soils in the upper 2 to 5m across the site, grading into hard, weathered Queenston Formation Shale with depth. Groundwater levels were measured once at the end of March in the installed standpipes/monitoring wells with levels recorded from 9m below grade to 0.1m above existing grade.

Groundwater monitoring wells were installed at select locations as specified by Cole Engineering to assist their hydrogeologic study.

Due to the density of the encountered soil and/or bedrock, it is our opinion that excavations will require large, mechanical equipment in order to break up the hard conditions. The soil/rock excavation constraints should be further assessed with additional test pit investigation as the design proceeds and proposed excavation depths and locations are better understood. This will also assist with a better understanding of groundwater ingress and potential for temporary dewatering required during construction.

It is recommended that groundwater monitoring in the installed monitoring wells/standpipes should continue on a monthly basis in order to evaluate the magnitude of seasonal groundwater fluctuations and estimate peak levels which will affect the final design such as basement levels, deep road cuts, stormwater management pond design, etc.

Terraprobe should be involved through the design process to provide geotechnical consultation and support. Further investigation and/or review may be required for specific details of the development as the design progresses.

2.0 INTRODUCTION

We are pleased to present our report on the geotechnical investigation carried out for the proposed residential development in Meaford, Ontario. Authorization to complete this investigation was provided by Mr. Steve Warsh, on January 23, 2012.

The purpose of the investigation was to determine the soil, rock and groundwater conditions on the site as they pertain to the design and installation of proposed municipal services, internal road construction, stormwater management and general structure foundations. Excavation, dewatering, backfill and general construction constraints are also considered and discussed below.

Terraprobe was retained to provide preliminary geotechnical characterization of the site in order to guide design decisions. Additional investigation, monitoring and/or consulting may be required as the design progresses to final approvals. Specific details of the final design components were not available at the time of the submission of this report.

3.0 SITE AND PROJECT DESCRIPTION

The site is located on the east side of 3rd Line, south of Highway 26, in the Municipality of Meaford, Ontario (see Figure 1 & 2).

It is proposed to proceed with design and construction of full municipal services and internal streets associated with a Recreational Resort and Residential Development. The full development would include 1071 residential units, resort and recreational components (golf course).

The property is currently open, agricultural land for the most part with some overgrown areas of trees and brush. The site generally falls in grade by about 42m from the south to north (ie: elevation 357 to 315 m) on the upper plateau. Further to the north, grades fall significantly along a natural ridge making up portions of the northern property boundary. Georgian Bay is located north of the site.

Four (4) blocks of land dedicated for Stormwater Management Facilities are located throughout the property, and in the areas of Boreholes 3, 6, 12 and 16. The current Development Concept Plan is included as Figure 3 of this report.

There are several identified erosion gullies/wales on the property.

4.0 FIELD WORK

The field work associated with this project comprised of the advancement of twenty (20) sampled boreholes to depths of 6.6 to 9.6m below existing grade. An additional five (5) boreholes were advanced adjacent to

the 9.6m boreholes in order to allow installations of deep and shallow monitoring wells in separate holes as requested by Cole Engineering Group Ltd.

Borehole locations, depths and installations were selected in consultation with Cole Engineering and the design team. The proposed borehole locations were staked and surveyed by the client's surveyor. Buried service locates were organized by Terraprobe prior to initiating the field investigation.

The field work was completed between March 21 and 26, 2012, using a track-mounted D50T power auger provided by a specialist soil drilling contractor. At the time of drilling, Boreholes 1 and 3 were advanced at different locations than initially proposed and staked due to access constraints including tree cover and sloping ground. The new elevations for these two (2) boreholes were surveyed for elevation by Terraprobe and locations were collected by handheld GPS coordinates.

The sampled boreholes were advanced using Standard Penetration Test methods at regular 0.75 to 1.5 m intervals in each borehole. All soil samples were sealed in plastic containers and returned to our laboratory for further evaluation and testing including moisture content determination and select grain size analyses.

Following completion of the advancement of the boreholes, a standpipe type piezometer comprising of 19 mm diameter PVC tubing slotted at the base was installed in Boreholes 2, 7, 8, 11, 14, 15, 17, 19 and 20 while the remaining shallow and deep boreholes received Schedule 40, 50mm diameter monitoring wells as noted on the attached borehole logs.

A return visit was made to the site on March 29, 2012 to measure static water levels in the installed standpipes and monitoring wells.

The field work (drilling, sampling, testing) was observed and recorded by a member of our engineering staff, who also transported the samples to our geotechnical testing laboratory.

5.0 SUBSURFACE CONDITIONS

The details of the subsurface conditions encountered at each borehole are presented on the attached Borehole Logs. It should be noted that the conditions are confirmed at the borehole locations only and could vary between and beyond these locations. In addition, the changes in soil stratigraphy delineated on the Borehole

Logs have been inferred from non-continuous sampling. In this regard, the changes should be taken as transitions from one soil type to another as opposed to exact planes of geologic change.

In general, the boreholes encountered about 0 to 250mm of topsoil and/or organic stained silt. The native soils were primarily silt with some clay to clayey silt, trace sand and trace gravel (see attached grain size analyses). Occasional sandy seams or layers and cobbles/boulders were also noted as shown on the attached logs.

The upper red, clayey silt generally graded into weathered shale bedrock below depths of about 2 to 5.3m below existing grades (elevations 313.9 to 344.8m). It is typically difficult to distinguish the clayey silt from the underlying weathered shale bedrock. Based on the consistency and the relatively high penetration resistance, this stratum has been interpolated as a highly weathered zone of the bedrock formation.

Detailed coring of the bedrock was not carried out as part of this assignment, however, the bedrock beneath the site is known to consist of Queenston Formation Shale which is comprised of predominantly thinly bedded reddish brown calcareous shale with grey/green bands of inter-bedded argillaceous limestone. The limestone interbeds are typically about 50 to 75m thick however, limestone interbeds of up to 350mm have been reported for this formation. The shale is of relatively low strength and the harder limestone layers are of medium strength.

All of the boreholes were augered and sampled to their initially proposed drilling depth without grinding auger refusal on the bedrock stratum. This would generally suggest that the soil and bedrock encountered to the investigation extents will be excavatable with heavy, large excavation equipment.

The native soils exhibited moisture contents varying between 24 to 6% and generally decreased with depth. Moisture content in the shale generally ranged from about 5 to 24%. Some perched groundwater should be anticipated in sandy seams/layers.

Across the site, Standard Penetration Tests conducted in each borehole generally indicated 'N' values of about 8 to greater than 50 blows per 0.3 m of penetration with depth in the native soils and shale. Therefore, these soils are considered to be stiff to hard.

The water levels noted during drilling and measured during our return site visit are tabulated below.

Borehole Number	Ground Surface Elevation (m)	Water Level			
		Noted During Drilling		Measured March 29, 2012	
		Depth (m)	Elevation (m)	Depth (m)	Elevation (m)
1A (deep)	316.7	5.8	310.9	6.3	310.4
1B (shallow)	316.7	Dry	-	2.7	314.0
2	324.6	Dry	-	2.6	322.0
3	323.1	6.0	317.1	0.7	322.4
4	325.8	Dry	-	1.4	324.4
5A (deep)	326.3	Dry	-	9.0	317.3
5B (shallow)	326.3	Dry	-	2.0	324.3
6	329.5	Dry	-	3.2	326.3
7	333.0	Dry	-	1.8	331.2
8	331.4	5.8	325.6	1.6	329.8
9	331.7	Dry	-	(+0.1)	331.8
10A (deep)	339.0	1.8	337.2	2.2	336.8
10B (shallow)	339.0	1.8	337.2	0.7	338.3
11	340.5	5.6	334.9	4.1	336.4
12A (deep)	331.3	Dry	-	8.1	323.2
12B (shallow)	331.3	Dry	-	2.0	329.3
13	333.4	Dry	-	2.9	330.5
14	341.8	Dry	-	2.2	339.6
15	344.1	Dry	-	2.9	341.2
16A (deep)	324.1	5.5	318.6	5.6	318.5
16B (shallow)	324.1	Dry	-	2.7	321.4
17	341.6	3.3	338.3	3.1	338.5
18	353.6	Dry	-	4.0	349.6
19	347.0	1.8	345.2	1.6	345.4
20	341.2	5.5	335.7	2.0	339.2

It is anticipated that some fluctuations of the groundwater table will occur seasonally and may be higher during wetter seasons and/or years. It is our recommendation that ongoing monthly monitoring of static

groundwater levels continue through the spring/summer of 2012 as a minimum and preferably for a full year in order to better define the seasonal fluctuation and peak levels. Shallow groundwater flow direction appears to generally fall with surface topography from a high point in the central part of the site, along the south property line, down towards the north, east and west. Shallow, overburden water levels generally fall in elevation from about 350m (Borehole 18) to 314m (Borehole 1). The groundwater levels measured in the deeper, bedrock monitoring wells indicate levels that are about 1.5 to 7m lower than the adjacent, overburden water levels indicating a downward gradient on these upper table lands. A slightly artesian water level was measured at Borehole 9.

It is our understanding that the soil and groundwater conditions encountered to date will also be utilized by the clients civil, hydrogeological and environmental consultants as the design is refined.

6.0 DISCUSSION AND RECOMMENDATIONS

The following discussion and recommendations are based on the factual data obtained from this investigation and are intended for use by the design engineers only. Contractors bidding on this project or conducting work associated with this project should make their own interpretation of the factual data and/or carry out their own investigations.

Generally, the site is underlain with stiff to hard native clayey silt soils over weathered shale bedrock.

6.1 Foundations

The undisturbed soils beneath the topsoil and/or any fill are considered suitable for the support of conventional spread and/or strip footings for structures.

The very stiff to hard native conditions encountered below about 0.8m depth (i.e: typical 'N' values greater than 20 blows per 0.3m of penetration) will allow structure foundations, etc. to be designed for a maximum soil bearing pressure of 200kPa (SLS). A corresponding factored bearing capacity at Ultimate Limit State (ULS) of approximately 300kPa may be used. Greater capacity may be available at greater depth if required for specific resort/recreational components and can be assessed by Terraprobe on a case by case basis, if required.

A minimum soil cover of 1.5m or equivalent insulation is recommended for frost protection to footings in exterior or unheated areas. Construction during cold weather should also ensure temporary frost protection of footing bases.

The minimum footing widths to be used in conjunction with the above recommended soil bearing pressures should be 0.5m for continuous footings and 0.8m for individual footings. The above recommended bearing capacities are based on estimated maximum total settlement of 25 mm and differential settlement of 19mm.

It should also be noted that due to the variable conditions in the upper 1.0 to 2.0m of the site, some downward stepping of footings should be anticipated in order to extend to competent soils.

Prior to placement of concrete for footings, the footing bases should be cleaned of all deleterious materials such as topsoil, fill, softened or disturbed materials as well as any standing water. It is recommended that the foundations be inspected by Terraprobe in order to confirm the exposed soil conditions and recommended bearing capacities. If construction proceeds during freezing weather conditions, adequate temporary frost protection for the footing bases and concrete must be provided.

Perimeter drainage measures for basements as per the Ontario Building Code should be implemented.

Areas of the property may require engineered fill to raise grades. This should be completed under full time supervision by Terraprobe to monitor extent, lift thickness, compaction, material quality and the like.

Where structures are placed on at least 0.5m of engineered fill, the recommended maximum bearing capacity may be 150 kPa. Engineered fill material may consist of granular type soils placed with moisture control in maximum 150 mm loose lifts and compacted uniformly to a minimum of 98% of Standard Proctor Maximum Dry Density. Terraprobe's detailed engineered fill specifications will need to be followed if this option is pursued.

6.2 Concrete Slab-On-Grade or Basement Floors

Conventional lightly loaded concrete slab-on-grade or basement floors can be placed on the existing native inorganic soil subgrade below all deleterious materials, or on engineered fill placed under full time supervision, provided a moisture break consisting of a minimum of 150 mm of OPSS Granular 'A' type

material compacted to a minimum of 100% of Standard Proctor Maximum Dry Density (SPMDD) is placed directly below the slab.

All basement floors should be constructed at least 0.3m above the seasonally high water level. Perimeter, filtered, weeping drains must also be installed leading to positive outlets such as a sump pump in the basement as per the current building code. Basement walls must be backfilled either with imported Granular 'B' type backfill or drainage mediums as per the Ontario Building Code. Basements may need to be raised by the designers in some areas based on the groundwater levels measured to date.

Based on the magnitude and importance of this proposed development, we would strongly recommend continued monthly monitoring of groundwater levels in the installed standpipes in order to support design decisions (such as basement levels, deep excavations, etc.) as the design progresses.

6.3 Excavations

The recommended safe side slope configuration for temporary unbraced excavations above the groundwater level through the native stiff to hard soils is 1 to 1 (horizontal to vertical) typically.

A Type 2 soil is characteristic of the site soils above the water level where 1 to 1 side slopes from 1.2m above the base of the trench to ground surface should be used when workers must enter trenches deeper than 1.2m. Soils below the groundwater level are typically very dense overburden or shale and should be Type 2 also.

Excavations deeper than about 0.3m below the encountered water level where sandy seams are intercepted may require localized sump pumping from widened trenches. Depending on excavation depths, a Permit to Take Water from the MOE may be required for construction works at this site (ie: more than 50,000 litres per day dewatering). These permits are currently taking several months to obtain. However, this is not expected for the majority of the site.

The attached grain size analyses indicate permeabilities of the native clayey silt soils in the range of 10^{-7} to 10^{-8} cm/s.

Excavations are expected to be through stiff becoming hard cohesive silt grading into Queenston Shale.

Large mechanical excavation equipment is anticipated to be required to conduct deeper cuts in particular.

As the site servicing plan is developed and advanced we would recommend that several test pits be excavated on site to further evaluate the soil/rock excavation constraints.

6.4 Backfill

Based on our experience with silt to clayey silt soils, the water contents of the upper native site soils are primarily in the range of 24 to 6% by weight. The estimated optimum water content for Standard Proctor compaction is about 9 to 12%. Generally, soils can be sufficiently compacted at moisture contents up to about 3% wetter than optimum. In this regard, a small portion of the upper native site soils fall within or below this range and will be suitable for reuse as compacted fills during the construction process (ie: deeper soils). Generally, the native soils will need to be mixed with drier soils or be wasted during the construction process.

Earth fill materials placed beneath settlement sensitive areas such as floor slabs, sidewalks, pavement structures and the like should be compacted to a minimum of 95% of Standard Proctor Maximum Dry Density in lifts not exceeding 200mm.

The topsoil materials and organic rich sands encountered at the site should not be used as backfill in settlement sensitive areas such as those noted above. The topsoil material may be stockpiled and reused for landscaping purposes or wasted.

Should construction be conducted during the winter season, it is imperative to ensure that frozen materials are not utilized as trench backfill.

It is recommended that inspection and testing be carried out by Terraprobe during construction to confirm trench backfill quality, thickness and to ensure adequate compaction.

The majority of the excavated shale is anticipated to break down and can be reused as general backfill on site for grading. Careful control is needed for replacing in trenches and/or confined backfill zones to ensure it is “kneaded”/broken down into pieces less than 150mm in size. It is important to ensure a “void free” fill

is created. Further assessment and recommendation from Terraprobe is recommended during construction to provide specific recommendations.

6.5 Lateral Earth Pressures on Subsurface Walls

The boreholes encountered primarily cohesive silt to clayey silt soils, for the most part in a stiff to hard condition within the upper 2 to 3m of ground surface.

For design of rigid concrete walls, the following design parameters are recommended.

		Stiff to hard
soil unit weight	γ	18.5 kN/m ³
angle of internal friction	ϕ'	30°
coefficient of lateral earth pressure "at rest"	k_o	0.5

The recommended design angle of friction between concrete and the native soil is 24°. Associated with the above is the inherent assumption that hydrostatic pressure will not be allowed to develop behind these wall structures. In this regard, perimeter drainage systems will need to be implemented.

6.6 Pipe Bedding

Based on anticipated service inverts of about 2 to 4m below existing grade, the trench base is expected to consist of stiff to hard silt to clayey silt and/or weathered shale. The undisturbed native soils encountered at the site will generally be suitable for support of underground services with conventional Class 'B' granular bedding. Additional granular bedding may be necessary for stabilization of wet trench bases. The granular bedding should consist of a well graded material such as Granular 'A'. Excavation bases should be free of standing water prior to and during bedding and service placement.

Any soft, loose or disturbed soils encountered as a result of groundwater seepage or construction traffic should be subexcavated and replaced with suitably compacted granular fill. Granular 'A' bedding material should be placed in thin lifts and compacted to a minimum of 95% of SPMDD. If HL 8 course aggregate or 19mm clear stone is used this will require light tamping only. However, it should be cautioned that this HL8 aggregate or clear stone should not be used directly against native deposits unless a geotextile fabric

is also considered as a complete wrap to prevent migration of fines into the bedding from the surrounding fine soil.

6.7 Thrust Blocks and Pipe Restraints

It is recommended that the thrust blocks be cast directly against undisturbed native ground. The maximum allowable bearing pressures for design of thrust blocks against undisturbed native soil where there is soil cover over the block that equals the height of the block, is 200kPa.

The internal angle of friction between the thrust block and the soil may be taken as 33°.

The following design parameters are recommended for design of restrained joints;

- Ultimate friction angle between plastic or ductile iron pipe and compact bedding 24°
- Ultimate friction angle between concrete pipe and compact bedding 33°
- Maximum bearing of thrust pressure of pipe normal to bedding against native soil 200 kPa

6.8 Pavement Design Thickness

The pavement subgrade is expected to comprise of a silt to clayey silt in most cases or perhaps clean earth fill compacted to a minimum of 95% of SPMDD. The exposed subgrade should be shaped and graded with a typical 3% cross-fall, directed towards continuous subdrains and/or open ditches with inverts at least 0.3m below subgrade level.

The pavement subgrade should be proof rolled to evaluate its stability. All unstable areas will require sub-excavation and re-compaction or increased thickness of granular subbase. It should be noted that the majority of the upper site soils are considered somewhat frost susceptible. Therefore, adequate subgrade drainage is recommended.

Based on the soil conditions encountered during our investigation, we recommend that a sufficient pavement structure for internal, local roads will be as follows;

HL 3 (surface) asphalt	40 mm
HL 8 (binder) asphalt	50 mm
OPSS Granular 'A' (base course)	150 mm
OPSS Granular 'B' (subbase course)	400 mm
Total	640 mm

The above design assumes that sub-drainage of the granular fill will be provided. This should consist of continuous subdrains leading to catch basins and/or open ditches.

It should be reiterated that the subgrade soils are frost susceptible. The subdrains are considered a valuable protection against frost heave damage and subgrade softening particularly impacting the long term performance of the pavement.

All topsoil and any organic-rich material should be removed from below settlement sensitive areas such as pavements. Immediately prior to placement of the pavement granular courses, the subgrade should be proof rolled with a heavy rubber tired vehicle (such as a grader) and any loose, soft or unstable areas should be subexcavated and backfilled with compacted materials.

The granular subbase and base fill materials should be compacted to a minimum of 100% of Standard Proctor Maximum Dry Density (SPMDD), placed in lifts of 150 mm or less. Asphaltic concrete materials should be rolled and compacted to a minimum of 97% of Marshall Bulk Density (MBD) based on nuclear density testing.

The above pavement design thicknesses are considered adequate for the design traffic. However, if pavement construction occurs in wet inclement weather it may be necessary to provide additional subgrade support for heavy construction traffic by increasing the thickness of the granular subbase or base course materials. Further, main traffic access areas for construction equipment may experience unstable subgrade conditions. These may need stabilization utilizing additional thickness of granular materials.

It is recommended that inspection and testing be carried out during construction to confirm material quality, thickness and to ensure adequate compaction.

6.9 Earthquake Design Parameters

The Ontario Building Code (2006) stipulates the methodology for earthquake design analysis, as set out in Subsection 4.1.8.7. The determination of the type of analysis is predicated on the importance of the structure, the spectral response acceleration and the site classification.

The parameters for determination of Site Classification for Seismic Site Response are set out in Table 4.1.8.4A of the Ontario Building Code (2006). The classification is based on the determination of the average shear wave velocity in the top 30 metres of the site stratigraphy, where shear wave velocity (v_s) measurements have been taken. Alternatively, the classification is estimated on the basis of rational analysis of undrained shear strength (s_u) or penetration resistance.

$$v_{s-avg} = \frac{\sum_{i=1}^n d_i}{\sum_{i=1}^n \frac{d_i}{v_{si}}}$$

Shear wave velocity

$$s_{u-avg} = \frac{\sum_{i=1}^n d_i}{\sum_{i=1}^n \frac{d_i}{s_{ui}}}$$

Undrained shear strength

$$N_{avg} = \frac{\sum_{i=1}^n d_i}{\sum_{i=1}^n \frac{d_i}{N_i}}$$

SPT N-values

At this site the stratigraphy beneath the buildings will consist of at least 9.6 metres of soil with a penetration resistance averaging at least 50 to 60 blows per 300 mm. The soils are primarily hard clayey silt to shale at depth. It is known that the deeper stratigraphy in this area is at least as competent. On this basis, the site designation for seismic analysis is Class C, according to Table 4.1.8.4.A of the Ontario Building Code (2206). Tables 4.1.8.4B and 4.1.8.4C of the same code provide the applicable acceleration and velocity based site coefficients.

Site Class	Values of F_a				
	$S_a(0.2) \leq 0.25$	$S_a(0.2) = 0.50$	$S_a(0.2) = 0.75$	$S_a(0.2) = 1.00$	$S_a(0.2) \geq 1.25$
C	1.0	1.0	1.0	1.0	1.0

Site Class	Values of F_v				
	$S_a(1.0) \leq 0.1$	$S_a(1.0) = 0.2$	$S_a(1.0) = 0.3$	$S_a(1.0) = 0.4$	$S_a(1.0) \geq 0.5$
C	1.0	1.0	1.0	1.0	1.0

6.10 Stormwater Management Facilities

Boreholes 3, 6, 12 and 16 were advanced in or near the proposed storm pond areas as shown approximately on Figures 2 and 3.

It is our understanding that the pond proposed in the area of Borehole 3 will be a wet facility, while the remaining SWM ponds will be dry facilities.

The pond designs have not been completed at the time of this investigation. However, based on the soils encountered, we would not anticipate that the ponds will need to be lined.

The attached reports indicate grain size analyses for the different strata encountered in these boreholes. Based on the above, we would expect the proposed ponds to be situated in stiff to hard clayey silt to weathered shale. We would estimate a coefficient of permeability of about 10^{-7} to 10^{-8} cm/s in the silt to clayey silt grading to weathered shale.

Pond geometry of 4:1 (horizontal to vertical) internal side slopes are appropriate below the normal high groundwater level for the type and density of the soils encountered during our investigation. Additional monitoring would be required to confirm groundwater levels. Interior slopes above the normal high water level could be constructed to a maximum of 3:1 (horizontal to vertical). Exterior berm slopes may be created to 3:1 which will also be suitable from a geotechnical perspective depending on whether maintenance and/or grass cutting will be required on the slopes.

It is our understanding that runoff from the site will be collected and directed to stormwater management ponds through lined channels before being released in a controlled manner to suitably protected discharge points.

6.11 Soil Chemistry Analysis

As requested, Terraprobe has collected topsoil samples for pesticide analysis further to the Phase One ESA conducted for this site. The details of the sampling and testing are reported under separate cover by Terraprobe.

6.12 Slope Stability Analysis and Development Setbacks

Terraprobe has conducted a comprehensive slope stability study based on the subsurface findings of this investigation. The results of this assessment and the recommended development setbacks are reported under separate cover by Terraprobe.

7.0 CONCLUSIONS

Terraprobe was retained to provide preliminary geotechnical characterization of the site and to provide recommendations based on these findings to guide design decisions.

Terraprobe observed and recorded the advancement of twenty (20) sampled boreholes on the subject property. The boreholes generally indicated stiff to hard silt to clayey silt overburden soils in the upper 2 to 5m across the site, grading into hard, weathered Queenston Formation Shale with depth. As noted above, groundwater levels were measured once at the end of March in the installed standpipes/monitoring wells with levels recorded from 9m below grade to 0.1m above existing grade.

Groundwater monitoring wells were installed at select locations as specified by Cole Engineering to assist their hydrogeologic study.

Due to the density of the encountered soil and/or bedrock, it is our opinion that excavations will require large, mechanical equipment in order to break up the hard conditions. The soil/rock excavation constraints should be further assessed with additional test pit investigation as the design proceeds and proposed excavation depths and locations are better understood. This will also assist with a better understanding of groundwater ingress and potential for temporary dewatering required during construction.

It is recommended that groundwater monitoring in the installed monitoring wells/standpipes should continue on a monthly basis in order to evaluate the magnitude of seasonal groundwater fluctuations and estimate peak

levels which will affect the final design such as basement levels, deep road cuts, stormwater management pond design, etc.

Terraprobe should be involved through the design process to provide geotechnical consultation and support. Further investigation and/or review may be required for specific details of the development as the design progresses.

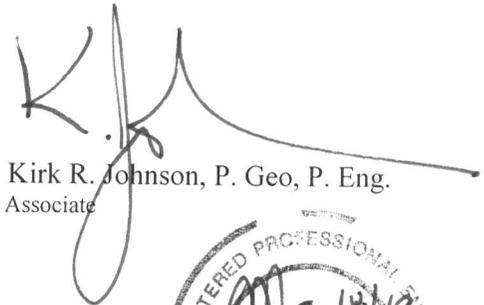
We trust the foregoing information will satisfy your present requirements. If you should have any questions, or if we can be of further assistance, please do not hesitate to contact us.

Sincerely,
Terraprobe Inc.



Blair E. Goss, P. Eng.
Associate

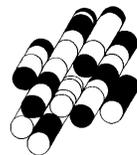
BEG/ct
Barrie Office



Kirk R. Johnson, P. Geo, P. Eng.
Associate



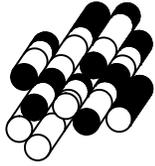
BOREHOLE LOGS



Terraprobe Inc.

BOREHOLE LOGS

SAMPLING METHOD		PENETRATION RESISTANCE		
SS	split spoon	Standard Penetration Test (SPT) resistance ('N' values) is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a standard 50 mm (2 in.) diameter split spoon sampler for a distance of 0.3 m (12 in.).		
ST	Shelby tube			
AS	auger sample	Dynamic Cone Test (DCT) resistance is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a conical steel point of 50 mm (2 in.) diameter and with 60° sides on 'A' size drill rods for a distance of 0.3 m (12 in.).		
WS	wash sample			
RC	rock core			
WH	weight of hammer			
PH	pressure, hydraulic			
SOIL DESCRIPTION - COHESIONLESS SOILS		SOIL DESCRIPTION - COHESIVE SOILS		
Relative Density	'N' value	Consistency	Undrained Shear Strength, kPa	'N' value
very loose	< 4	very soft	< 12	< 2
loose	4 - 10	soft	12 - 25	2 - 4
compact	10 - 30	firm	25 - 50	4 - 8
dense	30 - 50	stiff	50 - 100	8 - 16
very dense	> 50	very stiff	100 - 200	16 - 32
		hard	> 200	> 32
SOIL COMPOSITION		TESTS, SYMBOLS		
	% by weight	MH	mechanical sieve and hydrometer analysis	
'trace' (e.g. trace silt)	< 10	w, w _c	water content	
'some' (e.g. some gravel)	10 - 20	w _l	liquid limit	
adjective (e.g. sandy)	20 - 35	w _p	plastic limit	
'and' (e.g. sand and gravel)	35 - 50	I _p	plasticity index	
		k	coefficient of permeability	
		Y	soil unit weight, bulk	
		φ'	angle of internal friction	
		c'	cohesion shear strength	
		C _c	compression index	
GENERAL INFORMATION, LIMITATIONS				
<p>The conclusions and recommendations provided in this report are based on the factual information obtained from the boreholes and/or test pits. Subsurface conditions between the test holes may vary.</p>				
<p>The engineering interpretation and report recommendations are given only for the specific project detailed within, and only for the original client. Any third party decision, reliance, or use of this report is the sole and exclusive responsibility of such third party. The number and siting of boreholes and/or test pits may not be sufficient to determine all factors required for different purposes.</p>				
<p>It is recommended Terraprobe be retained to review the project final design and to provide construction inspection and testing.</p>				



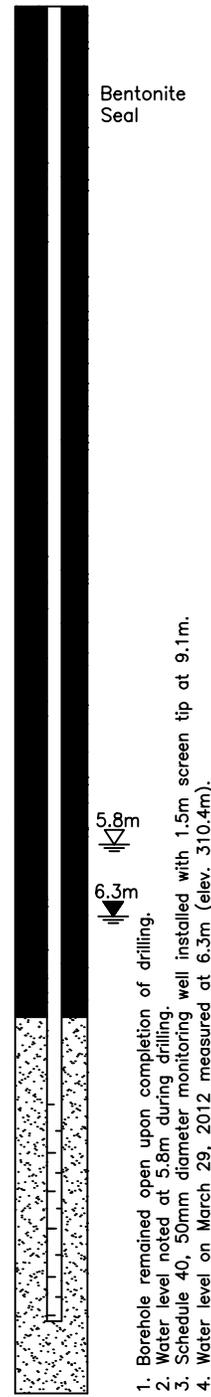
Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

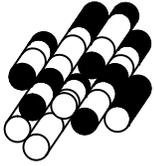
LOG OF BOREHOLE ..1A..

PROJECT No.: 31-12-8015
 BORING DATE: March 26, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80				
0	GROUND SURFACE		316.7											
	75mm - TOPSOIL		0.0											
	Red Stiff to Hard Moist			1	SS	9	x							
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth, with grey seams/inclusions			2	SS	25		x						
				3	SS	40			x					
2				4	SS	50/150mm								
			313.9											
3	Red Hard Moist to Wet		2.8											
	SHALE, with limey inter beds, weathered, thinly bedded			5	SS	86				x				
4				6	SS	50/150mm								
5				7	SS	50/150mm								
			309.5											
7	Grey Hard Wet		7.2											
	CLAYEY SILT, to SHALE, grinding on hard layers			8	SS	50/50mm								
8				9	AS	50/50mm								
			307.1											
9	End of Borehole		9.6											



- Borehole remained open upon completion of drilling.
- Water level noted at 5.8m during drilling.
- Schedule 40, 50mm diameter monitoring well installed with 1.5m screen tip at 9.1m.
- Water level on March 29, 2012 measured at 6.3m (elev. 310.4m).



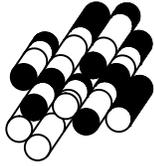
Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

LOG OF BOREHOLE ..1B..

PROJECT No.: 31-12-8015
 BORING DATE: March 26, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES		PENETRATION RESISTANCE PLOT X_x				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH kPa							
						20	40	60	80	nat.V - +	Q - ●	rem.V - ⊕	
0	GROUND SURFACE		316.7										
	See Borehole Log 1A for strata description.		0.0										
3	End of Borehole		313.7										
3			3.0										<p>1. Borehole remained open upon completion of drilling.</p> <p>2. Water level noted dry during drilling.</p> <p>3. Schedule 40, 50mm diameter monitoring well installed with 1.5m screen tip at 3.0m.</p> <p>4. Water level on March 29, 2012 measured at 2.7m (elev. 314.0m).</p>
4													
5													
6													
7													
8													
9													



Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

LOG OF BOREHOLE ..2..

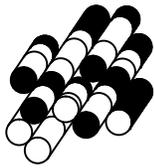
PROJECT No.: 31-12-8015
 BORING DATE: March 26, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT $\begin{matrix} x \\ x \\ x \end{matrix}$				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80				
0	GROUND SURFACE		324.6											
	50mm - TOPSOIL		0.0											
	Red Stiff to Hard Moist			1	SS	8	x							
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth, with grey seams/inclusions			2	SS	20	x							
				3	SS	33	x							
				4	SS	39	x							
				5	SS	67	x							
4	Red Hard Moist		320.6											
	SHALE, with limy inter beds, weathered, thinly bedded		4.0	6	SS	50/125mm								
				7	SS	50/75mm								
				318.0										
	End of Borehole		6.6											
7														
8														
9														

Bentonite Seal

 2.6m

- Borehole remained open upon completion of drilling.
- Water level noted dry during drilling.
- 75mm standpipe installed with 3m slotted screen tip at 6.1m.
- Water level on March 29, 2012 measured at 2.6m (elev. 322.0m).



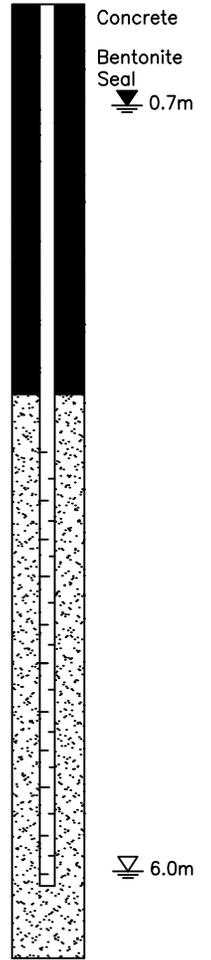
Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

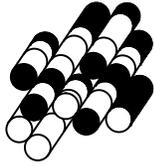
LOG OF BOREHOLE ..3..

PROJECT No.: 31-12-8015
 BORING DATE: March 22, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80				
0	GROUND SURFACE		323.1											
	Red Stiff to Hard Moist		0.0	1	SS	7	x							
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth, with grey seams/inclusions			2	SS	19	x							
2				3	SS	36	x							
3			320.5	4	SS	50/125mm								
	Red Hard Moist		2.6											
4	SHALE, with limy inter beds, weathered, thinly bedded. with wet sand seam noted at 4.8m			5	SS	50/150mm								
5				6	SS	50/150mm								
6				7	SS	50/65mm								
			316.5											
7	End of Borehole		6.6											
8														
9														



- Borehole remained open upon completion of drilling.
- Water level noted at 6.0m during drilling.
- Schedule 40, 50mm diameter monitoring well installed with 3m slotted screen tip at 6.1m.
- Water level on March 29, 2012 measured at 0.7m (elev. 322.4m).



Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

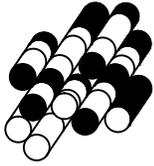
LOG OF BOREHOLE ..4..

PROJECT No.: 31-12-8015
 BORING DATE: March 21, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80				
0	GROUND SURFACE		325.8											
	100mm - TOPSOIL		0.0											
	Red Stiff to Hard Moist			1	SS	8	x							
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth, with grey seams/inclusions			2	SS	28		x						
				3	SS	26		x						
2				4	SS	50/100mm								
3				5	SS	50/25mm								
	Red Hard Moist		322.6 3.2											
4	SHALE, with limey inter beds, weathered, thinly bedded			6	SS	50/100mm								
5				7	SS	50/100mm								
6														
	End of Borehole		319.2 6.6											
7														
8														
9														

Concrete
Bentonite Seal
1.4m

- Borehole remained open upon completion of drilling.
- Water level noted dry during drilling.
- Schedule 40, 50mm diameter monitoring well installed with 3m slotted screen tip at 6.2m.
- Water level on March 29, 2012 measured at 1.4m (elev. 324.4m).



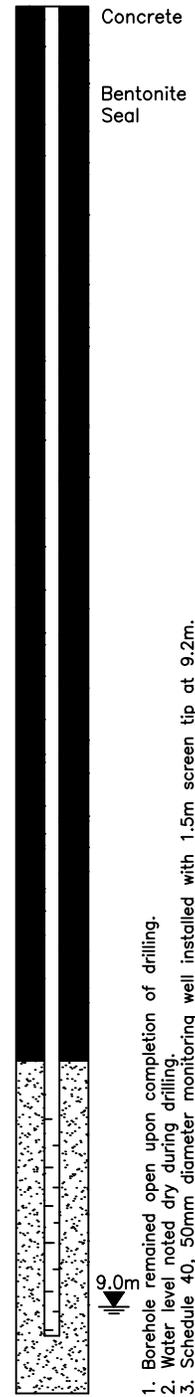
Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

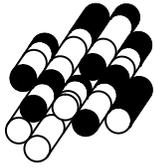
LOG OF BOREHOLE ..5A..

PROJECT No.: 31-12-8015
 BORING DATE: March 22, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES		PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION	
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa				WATER CONTENT (%)			
							20	40	60	80	10	20		30
0	GROUND SURFACE		326.3											
	150mm - TOPSOIL		0.0											
	Red Stiff to Hard Moist			1	SS	6	x							
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth, with grey seams/inclusions			2	SS	24		x						
2				3	SS	31		x						
3				4	SS	46		x						
3				5	SS	50	150mm							
4	Red Hard Moist		322.8											
4	SHALE, with limy inter beds, weathered, thinly bedded, with grey layers, difficult augering below 8.5m		3.5											
5				6	SS	50	125mm							
6				7	SS	50	100mm							
8				8	SS	50	25mm							
9				9	SS	50	15mm							
9.6	End of Borehole		316.7											



- Borehole remained open upon completion of drilling.
- Water level noted dry during drilling.
- Schedule 40, 50mm diameter monitoring well installed with 1.5m screen tip at 9.2m.
- Water level on March 29, 2012 measured at 9.0m (elev. 317.3m).



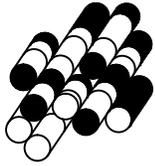
Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

LOG OF BOREHOLE ..5B..

PROJECT No.: 31-12-8015
 BORING DATE: March 22, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT $\times \times \times$				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80				
0	GROUND SURFACE		326.3											<p>Concrete Bentonite Seal Well Sand</p> <p>2.0m</p>
	See Borehole Log 5A for strata description.		0.0											
6	End of Borehole		320.2											
6.1			6.1											<ol style="list-style-type: none"> Borehole remained open upon completion of drilling. Water level noted dry during drilling. Schedule 40, 50mm diameter monitoring well installed with 3m screen tip at 6.0m. Water level on March 29, 2012 measured at 2.0m (elev. 324.3m).



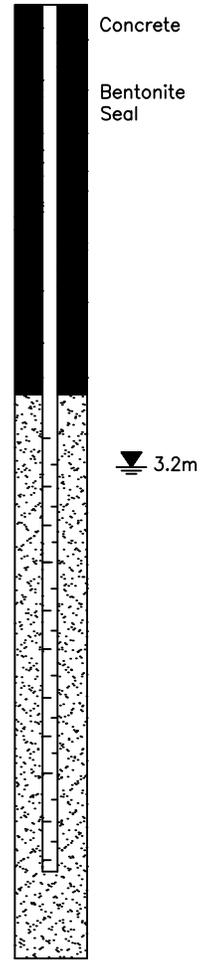
Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

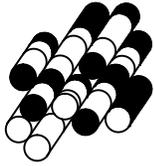
LOG OF BOREHOLE ..6..

PROJECT No.: 31-12-8015
 BORING DATE: March 22, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80				
0	GROUND SURFACE		329.5											
	75mm - TOPSOIL Red/Grey	Stiff to Hard Moist	0.0	1	SS	4 x								
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth, with grey seams/inclusions			2	SS	19	x							
2				3	SS	40		x						
3				4	SS	50/125mm								
3	Red	Hard	Moist	5	SS	50/150mm								
4	SHALE, with limey inter beds, weathered, thinly bedded, difficult augering below 5.5m			6	SS	50/90mm								
5				7	SS	50/75mm								
6				End of Borehole		6.6								
7														
8														
9														



- Borehole remained open upon completion of drilling.
- Water level noted dry during drilling.
- Schedule 40, 50mm diameter monitoring well installed with 3m slotted screen tip at 6.0m.
- Water level on March 29, 2012 measured at 3.2m (elev. 326.3m).



Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

LOG OF BOREHOLE ..7..

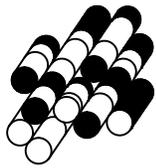
PROJECT No.: 31-12-8015
 BORING DATE: March 22, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION	
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa								
							20	40	60	80					
0	GROUND SURFACE		333.0												
	200mm - TOPSOIL Red	Moist	0.0	1	SS	5	x								
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth, with brown sandy silt seams			2	SS	21	x								
				3	SS	23	x								
				4	SS	30	x								
				5	SS	33	x								
4				Red	Hard	Moist	328.9								
5	SHALE, with limey inter beds, weathered, thinly bedded			6	SS	50/75mm									
7				7	SS	50/150mm									
				End of Borehole		326.4									
6.6															
7															
8															
9															

1.8m

Bentonite Seal

1. Borehole remained open upon completion of drilling.
2. Water level noted dry during drilling.
3. 75mm standpipe installed with 1.5m slotted screen tip at 6.1m.
4. Water level on March 29, 2012 measured at 1.8m (elev. 331.2m).



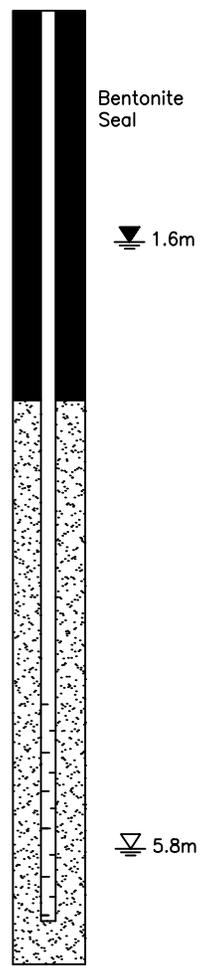
Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

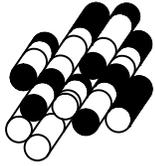
LOG OF BOREHOLE ..8..

PROJECT No.: 31-12-8015
 BORING DATE: March 21, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa				MP			
							nat.V - + Q - ● rem.V - ⊕ U - ○							
0	GROUND SURFACE		331.4											
	Red Stiff to Hard Moist		0.0	1	SS	11	x						○	
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth			2	SS	21	x						○	
				3	SS	19	x						○	
2				4	SS	39		x					○	
3				5	SS	26	x						○	
4														
5	Red Hard Moist		326.6	6	SS	80			x				○	
6	SHALE, with limey inter beds, weathered, thinly bedded		4.8											
				7	SS	50/75mm							○	
			324.8											
7	End of Borehole		6.6											
8														
9														



- Borehole remained open upon completion of drilling.
- Water level noted at 5.8m during drilling.
- 75mm standpipe installed with 1.5m slotted screen tip at 6.3m.
- Water level on March 29, 2012 measured at 1.6m (elev. 329.8m).



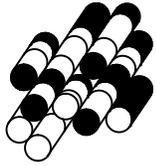
Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

LOG OF BOREHOLE ..9..

PROJECT No.: 31-12-8015
 BORING DATE: March 26, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa				WATER CONTENT (%)			
							20	40	60	80	10	20	30	
0	GROUND SURFACE		331.7											<p style="text-align: right;">+0.1m</p> <p style="text-align: center;">Bentonite Seal</p>
0	100mm - TOPSOIL Red Stiff to Hard Moist		0.0	1	SS	9	x							
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth			2	SS	20	x							
2				3	SS	30	x							
3				4	SS	22	x							
4				5	SS	41	x							
5			326.4	6	SS	50/125mm								
5	Red Hard Moist		5.3											
6	SHALE, with limey inter beds, weathered, thinly bedded			7	SS	50/50mm								
6			325.1											
7	End of Borehole		6.6											<ol style="list-style-type: none"> Borehole remained open upon completion of drilling. Water level noted dry during drilling. Schedule 40, 50mm diameter monitoring well installed with 3m slotted screen tip at 6.0m. Water level on March 29, 2012 measured at 0.1m above grade (elev. 331.8m).
8														
9														



Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

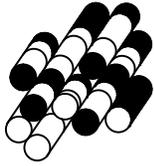
LOG OF BOREHOLE ..10A..

PROJECT No.: 31-12-8015
 BORING DATE: March 22, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD	DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	20	40	60	80	10	20	30	
D-50T Crawler-mounted Drill Rig / Solid Stem Augers	0	GROUND SURFACE		339.0											
	0.0	Red Stiff to Hard Moist		0.0	1	SS	8	x							
	1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth, trace to some gravel			2	SS	26		x						
	2	Grey Dense Wet GRAVEL & SAND, trace to some silt		337.2	3	SS	41			x					
	2.1	Red Hard Moist		336.9											
	3	SHALE, with limy inter beds, weathered, thinly bedded, with grey layers			4	SS	62				x				
	5				5	SS	35								
	6				6	SS	50/75mm								
	7				7	SS	50/50mm								
	8				8	SS	50/50mm								
9				9	SS	50/25mm									
		End of Borehole		329.4											
				9.6											



- Borehole remained open upon completion of drilling.
- Water level noted at 1.8m during drilling.
- Schedule 40, 50mm diameter monitoring well installed with 1.5m screen tip at 9.2m.
- Water level on March 29, 2012 measured at 2.2m (elev. 336.8m).



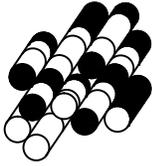
Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

LOG OF BOREHOLE ..10B..

PROJECT No.: 31-12-8015
 BORING DATE: March 22, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT $\times \times \times$				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80	20	40	60	
0	GROUND SURFACE		339.0											<p>Concrete Bentonite Seal ▽ 0.7m Well Sand ▽ 1.8m</p>
	See Borehole Log 10A for strata description.		0.0											
3.3	End of Borehole		335.7											<ol style="list-style-type: none"> Borehole remained open upon completion of drilling. Water level noted at 1.8m during drilling. Schedule 40, 50mm diameter monitoring well installed with 1.5m screen tip at 3.3m. Water level on March 29, 2012 measured at 0.7m (elev. 338.3m).
3.3			3.3											
4														
5														
6														
7														
8														
9														



Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

LOG OF BOREHOLE ..11..

PROJECT No.: 31-12-8015
 BORING DATE: March 22, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT $\times \times \times$				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80				
0	GROUND SURFACE		340.5											
	Red Stiff to Hard Moist		0.0	1	SS	9	x							
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth, with brown sandy silt seams			2	SS	35		x						
2				3	SS	50/125mm								
3			337.8	4	SS	74			x					
	Red Hard Moist		2.7											
5	SHALE, with limy inter beds, weathered, thinly bedded			5	SS	50/150mm								
6				6	SS	50/75mm								
7			333.9	7	SS	50/75mm								
	End of Borehole		6.6											
9														

D-50T Crawler-mounted Drill Rig / Solid Stem Augers

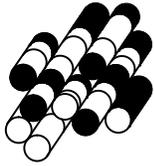
Bentonite Seal

▽ 4.1m

▽ 5.6m

1. Borehole remained open upon completion of drilling.
2. Water level noted at 5.6m during drilling.
3. 75mm standpipe installed with 1.5m slotted screen tip at 6.4m.
4. Water level on March 29, 2012 measured at 4.1m (elev. 336.4m).

SHEET 1 OF 1



Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

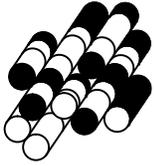
LOG OF BOREHOLE ..12A..

PROJECT No.: 31-12-8015
 BORING DATE: March 23, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD	DEPTH SCALE IN METRES	SOIL PROFILE		SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa						
D-50T Crawler-mounted Drill Rig / Solid Stem Augers	0	GROUND SURFACE		331.3										
		125mm - TOPSOIL		0.0										
		Red Stiff to Hard Moist			1	SS	10	x						
	1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth, with grey layers			2	SS	28		x					
	2				3	SS	43			x				
	3				4	SS	73				x			
	4				5	SS	33		x					
	4	Red Hard Moist		327.3										
	4	SHALE, with limey inter beds, weathered, thinly bedded, with grey layers at about 7.5 to 8.0m depth		4.0										
	5				6	SS	50/100mm							
6				7	SS	50/75mm								
7				8	SS	50/50mm								
8				9	SS	50/150mm								
9	End of Borehole		321.7											
			9.6											



1. Borehole remained open upon completion of drilling.
2. Water level noted dry during drilling.
3. Schedule 40, 50mm diameter monitoring well installed with 1.5m screen tip at 9.2m.
4. Water level on March 29, 2012 measured at 8.1m (elev. 323.2m).



Terraprobe

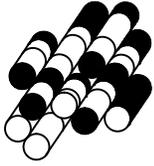
PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

LOG OF BOREHOLE ..12B..

PROJECT No.: 31-12-8015
 BORING DATE: March 23, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES		PENETRATION RESISTANCE PLOT $\times \times$				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH kPa							
						20	40	60	80	nat.V - +	Q - ●	rem.V - ⊕	
0	GROUND SURFACE		331.3										<p>Concrete Bentonite Seal Well Sand 2.0m</p>
	See Borehole Log 12A for strata description.		0.0										
3	End of Borehole		328.2										
3.1			3.1										<p>1. Borehole remained open upon completion of drilling.</p> <p>2. Water level noted dry during drilling.</p> <p>3. Schedule 40, 50mm diameter monitoring well installed with 1.5m screen tip at 3.1m.</p> <p>4. Water level on March 29, 2012 measured at 2.0m (elev. 329.3m).</p>

D-50T Crawler-mounted Drill Rig / Solid Stem Augers



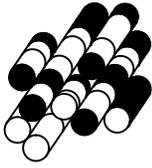
Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

LOG OF BOREHOLE ..13..

PROJECT No.: 31-12-8015
 BORING DATE: March 23, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES		PENETRATION RESISTANCE PLOT $\times \times \times$				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE "N" VALUE	20	40	60	80	SHEAR STRENGTH kPa <small>nat.V - + Q - ● rem.V - ⊕ U - ○</small>			
0	GROUND SURFACE		333.4										<p>Concrete</p> <p>Bentonite Seal</p> <p>2.9m</p>
0	150mm - TOPSOIL Red Stiff to Hard Moist		0.0	1	SS 10	x							
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth			2	SS 22	x							
2				3	SS 34	x							
3				4	SS 53		x						
3	Red Hard Moist		330.5	5	SS 50/150mm								
4	SHALE, with limy inter beds, weathered, thinly bedded, with grey layers		2.9										
5				6	SS 50/100mm								
6				7	SS 50/75mm								
7	End of Borehole		326.8										<ol style="list-style-type: none"> Borehole remained open upon completion of drilling. Water level noted dry during drilling. Schedule 40, 50mm diameter monitoring well installed with 3m screen tip at 6.2m. Water level on March 29, 2012 measured at 2.9m (elev. 330.5m).
6.6													
6.6													



Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

LOG OF BOREHOLE ..14..

PROJECT No.: 31-12-8015
 BORING DATE: March 26, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION	
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa								
							20	40	60	80	20	40	60		80
0	GROUND SURFACE		341.8												
	250mm - TOPSOIL Red/Grey	Stiff to Hard Moist to Wet	0.0	1	SS	9	x								
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth, with wet seam at 2m depth			2	SS	21	x								
					3	SS	35		x						
2					4	SS	54			x					
3					5	SS	55				x				
4					337.7										
	Grey	Hard	4.1												
5	SHALE, with limestone inter beds, 15mm thick layer of gypsum-like crystalline structure at 6.2m			6	SS	50/75mm									
6															
					335.2	7	SS	50/50mm							
7	End of Borehole		6.6												

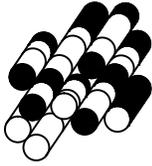
Bentonite Seal

Auger cuttings

2.2m

Bentonite Seal

- Borehole remained open upon completion of drilling.
- Water level noted dry during drilling.
- 75mm standpipe installed with 1.5m slotted screen tip at 6.1m.
- Water level on March 29, 2012 measured at 2.2m (elev. 339.6m).



Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

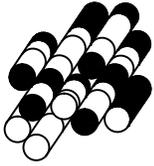
LOG OF BOREHOLE ..15..

PROJECT No.: 31-12-8015
 BORING DATE: March 26, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT $\begin{matrix} x \\ x \\ x \end{matrix}$				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa							
							20	40	60	80				
0	GROUND SURFACE		344.1											
	125mm - TOPSOIL Red to Grey	Stiff to Hard Moist	0.0	1	SS	9	x							
1	SILT, some clay to clayey, trace sand, trace to some gravel, grading into shale at depth, with occasional cobbles			2	SS	22	x							
2				3	SS	65		x						
	Grey to Red	Hard Moist	342.0											
			2.1	4	SS	50/100mm								
3	SHALE, with limey inter beds, weathered, thinly bedded, with wet seam at 5m depth			5	SS	50/150mm								
4														
5				6	SS	50/50mm								
6														
			337.5	7	SS	50/75mm								
	End of Borehole		6.6											
7														
8														
9														

Bentonite Seal
Auger cuttings
Bentonite Seal
2.9m

- Borehole remained open upon completion of drilling.
- Water level noted dry during drilling.
- 75mm standpipe installed with 3m slotted screen tip at 6.2m.
- Water level on March 29, 2012 measured at 2.9m (elev. 341.2m).



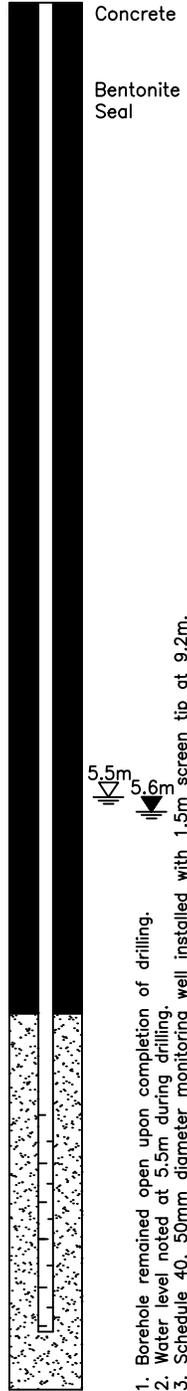
Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

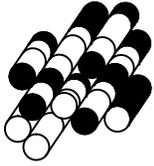
LOG OF BOREHOLE ..16A..

PROJECT No.: 31-12-8015
 BORING DATE: March 26, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa				WATER CONTENT (%)			
							20	40	60	80	10	20	30	
0	GROUND SURFACE		324.1											
	75mm - TOPSOIL		0.0											
	Red Stiff to Hard Moist			1	SS	8	x							
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth, with grey layers			2	SS	18	x							
				3	SS	26	x							
2				4	SS	44		x						
3				5	SS	48		x						
4				319.9										
	Red Hard Moist		4.2											
5	SHALE, with limey inter beds, weathered, thinly bedded			6	SS	71		x						
6				7	SS	50/125mm								
7				8	SS	50/125mm								
8				314.5										
	End of Borehole		9.6											



- Borehole remained open upon completion of drilling.
- Water level noted at 5.5m during drilling.
- Schedule 40, 50mm diameter monitoring well installed with 1.5m screen tip at 9.2m.
- Water level on March 29, 2012 measured at 5.6m (elev. 318.5m).



Terraprobe

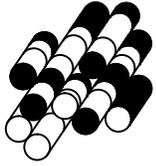
PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

LOG OF BOREHOLE ..16B..

PROJECT No.: 31-12-8015
 BORING DATE: March 26, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa				WATER CONTENT (%)			
							20	40	60	80	10	20	30	
0	GROUND SURFACE		324.1											<p>Concrete Bentonite Seal Well Sand 2.7m</p>
	See Borehole Log 16A for strata description.		0.0											
3	End of Borehole		321.0											
3.1			3.1											
4														
5														
6														
7														
8														
9														

1. Borehole remained open upon completion of drilling.
2. Water level noted dry during drilling.
3. Schedule 40, 50mm diameter monitoring well installed with 1.5m screen tip at 3.1m.
4. Water level on March 29, 2012 measured at 2.7m (elev. 321.4m).



Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

LOG OF BOREHOLE ..17..

PROJECT No.: 31-12-8015
 BORING DATE: March 26, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT $\times \times \times$				WATER CONTENT (%)			INSTALLATION INFORMATION	
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa								
							20	40	60	80					
							nat.V - + Q - ● rem.V - ⊕ U - ○								
							20	40	60	80					
D-50T Crawler-mounted Drill Rig / Solid Stem Augers	0	GROUND SURFACE		341.6											
		100mm - TOPSOIL Red	Stiff to Hard Moist	0.0	1	SS	7	x							
		1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth			2	SS	20	x						
		2				3	SS	35	x						
					339.4										
		Grey/Red	Hard Moist to Wet	2.2	4	SS	50/150mm								
	3	SHALE, with limey inter beds, weathered, thinly bedded, with wet seam at 2.2m and below 6m			5	SS	50/150mm								
	4														
	5				6	SS	50/125mm								
	6														
	7			335.0	7	SS	50/75mm								
		End of Borehole		6.6											
	7														
	8														
	9														

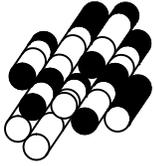
Auger cuttings

Bentonite Seal

3.1m

3.3m

- Borehole remained open upon completion of drilling.
- Water level noted at 3.3m during drilling.
- 75mm standpipe installed with 1.5m slotted screen tip at 6.2m.
- Water level on March 29, 2012 measured at 3.1m (elev. 338.5m).



Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

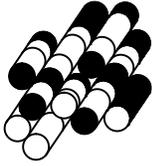
LOG OF BOREHOLE ..18..

PROJECT No.: 31-12-8015
 BORING DATE: March 26, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa				WATER CONTENT (%)			
							20	40	60	80	10	20	30	
0	GROUND SURFACE		353.6											
0	150mm - TOPSOIL Red Stiff to Hard Moist		0.0	1	SS	8	x							
1	CLAY & SILT, to CLAYEY SILT, trace sand, trace gravel, grading into shale at depth			2	SS	32		x						
2	Red Hard Moist		351.6	3	SS	42			x					
2			2.0	4	SS	65				x				
3	SHALE, with limy inter beds, weathered, thinly bedded, with grey layer at 5m depth			5	SS	50/150mm								
5				6	SS	50/100mm								
6				7	SS	50/100mm								
6.6	End of Borehole		347.0											
6.6			6.6											

Concrete
Bentonite Seal
4.0m

- Borehole remained open upon completion of drilling.
- Water level noted dry during drilling.
- Schedule 40, 50mm diameter monitoring well installed with 3m screen tip at 5.8m.
- Water level on March 29, 2012 measured at 4.0m (elev. 349.6m).



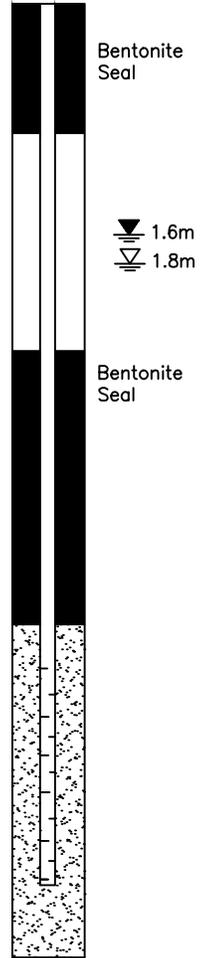
Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

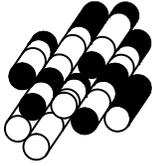
LOG OF BOREHOLE ..19..

PROJECT No.: 31-12-8015
 BORING DATE: March 26, 2012
 ELEVATION DATUM: Geodetic

BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT				WATER CONTENT (%)			INSTALLATION INFORMATION	
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa				WATER CONTENT (%)				
							20	40	60	80	10	20	30		
0	GROUND SURFACE		347.0												
0	100mm - TOPSOIL Red	Stiff to Hard Moist	0.0	1	SS	10	x								
1	CLAY & SILT, to CLAYEY SILT, trace sand, trace to some gravel, grading into shale at depth, with occasional cobbles			2	SS	27	x								
				3	SS	30	x								
2															
	Red/ Grey	Hard	Moist to Wet	4	SS	50/150mm									
3	SHALE, with limy inter beds, weathered, thinly bedded, with wet seam at 3.6m depth			5	SS	50/125mm									
4															
5															
6															
				6	SS	50/150mm									
				7	SS	50/75mm									
	End of Borehole		340.4												
7			6.6												
8															
9															



- Borehole remained open upon completion of drilling.
- Water level noted at 1.8m during drilling.
- 75mm standpipe installed with 1.5m slotted screen tip at 6.1m.
- Water level on March 29, 2012 measured at 1.6m (elev. 345.4m).



Terraprobe

PROJECT NAME: Meaford Subdivision
 CLIENT: Meaford A2A Developments Inc.
 LOCATION: Meaford, Ontario

LOG OF BOREHOLE ..20..

PROJECT No.: 31-12-8015
 BORING DATE: March 23, 2012
 ELEVATION DATUM: Geodetic

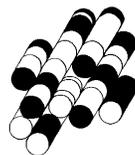
BORING METHOD DEPTH SCALE IN METRES	SOIL PROFILE			SAMPLES			PENETRATION RESISTANCE PLOT $\begin{matrix} x \\ x \\ x \end{matrix}$				WATER CONTENT (%)			INSTALLATION INFORMATION	
	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	"N" VALUE	SHEAR STRENGTH kPa								
							20	40	60	80					
0	GROUND SURFACE		341.2												
	150mm - TOPSOIL Red	Stiff to Hard Moist	0.0	1	SS	10	x								
1	SILT, some clay to clayey, trace sand, trace gravel, grading into shale at depth			2	SS	39		x							
					3	SS	37		x						
						4	SS	23		x					
						5	SS	24		x					
4			Red	Hard	Moist										
			337.2												
5	SHALE, with limey inter beds, weathered, thinly bedded		4.0	6	SS	50/150mm									
						7	SS	50/50mm							
			334.6												
	End of Borehole		6.6												
7															
8															
9															

Bentonite Seal
 2.0m

5.5m

- Borehole remained open upon completion of drilling.
- Water level noted at 5.5m during drilling.
- 75mm standpipe installed with 1.5m slotted screen tip at 6.0m.
- Water level on March 29, 2012 measured at 2.0m (elev. 339.2m).

GRAIN SIZE ANALYSIS



Terraprobe Inc.



Terraprobe

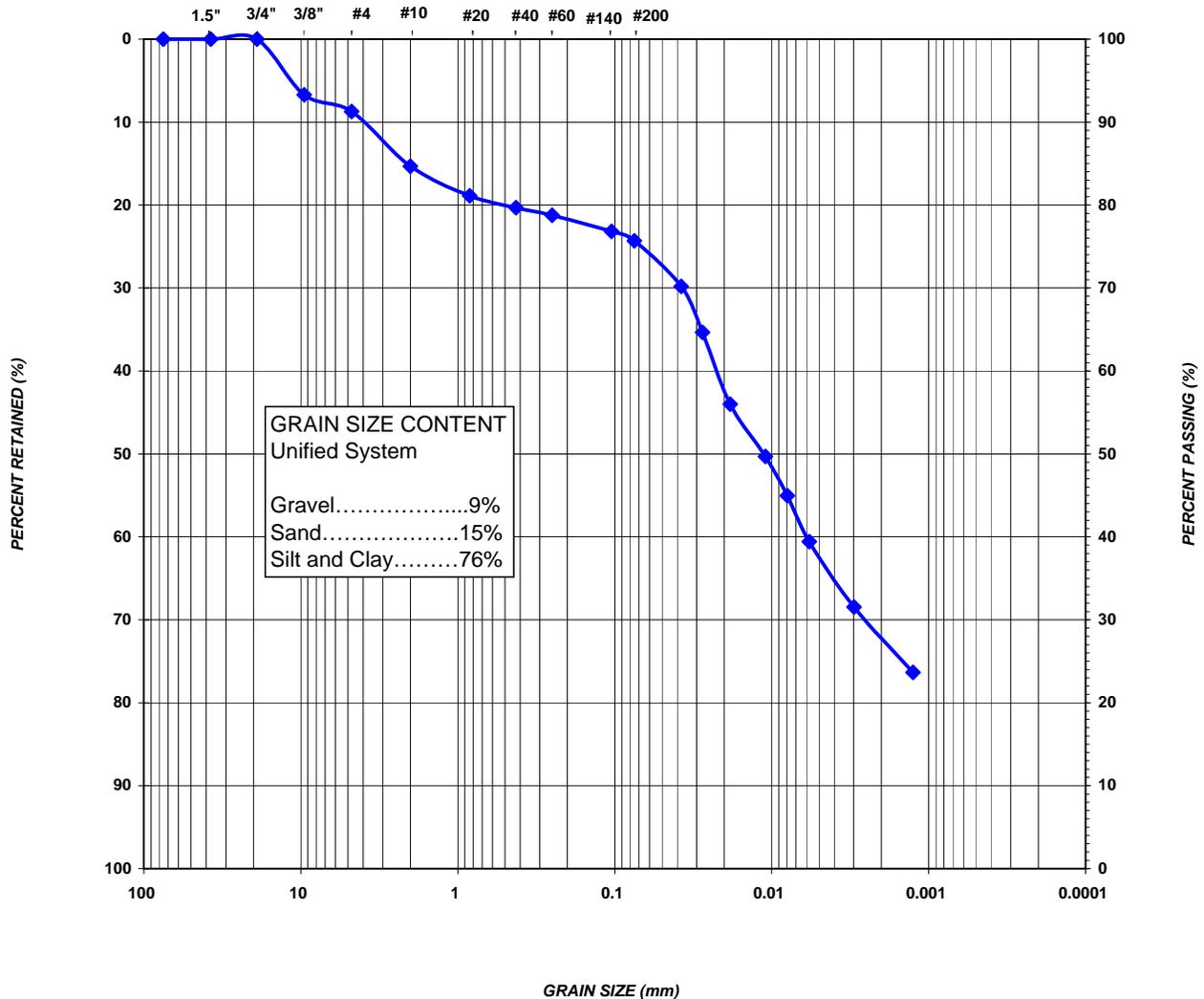
**SIEVE AND HYDROMETER ANALYSIS
TEST REPORT**

PROJECT: **Meaford Subdivision**
 LOCATION: **Meaford, ON**
 CLIENT: **Meaford A2A Developments Inc.**
 c/o Friedman & Associates
 BOREHOLE NUMBER: **1** SAMPLE DEPTH: **N/G**
 SAMPLE NUMBER: **2**
 SAMPLE LOCATION: **as above**
 SAMPLE DESCRIPTION: **Silt, some clay, some sand, trace gravel**

FILE NO.: **31-12-8015**
 LAB NO.: **1514a**
 SAMPLE DATE: **Apr-03-12**
 SAMPLED BY: **B.H.**

GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	GRAVEL		COARSE	MEDIUM	FINE	SILT	CLAY
	SAND						
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY	
	GRAVEL		SAND				



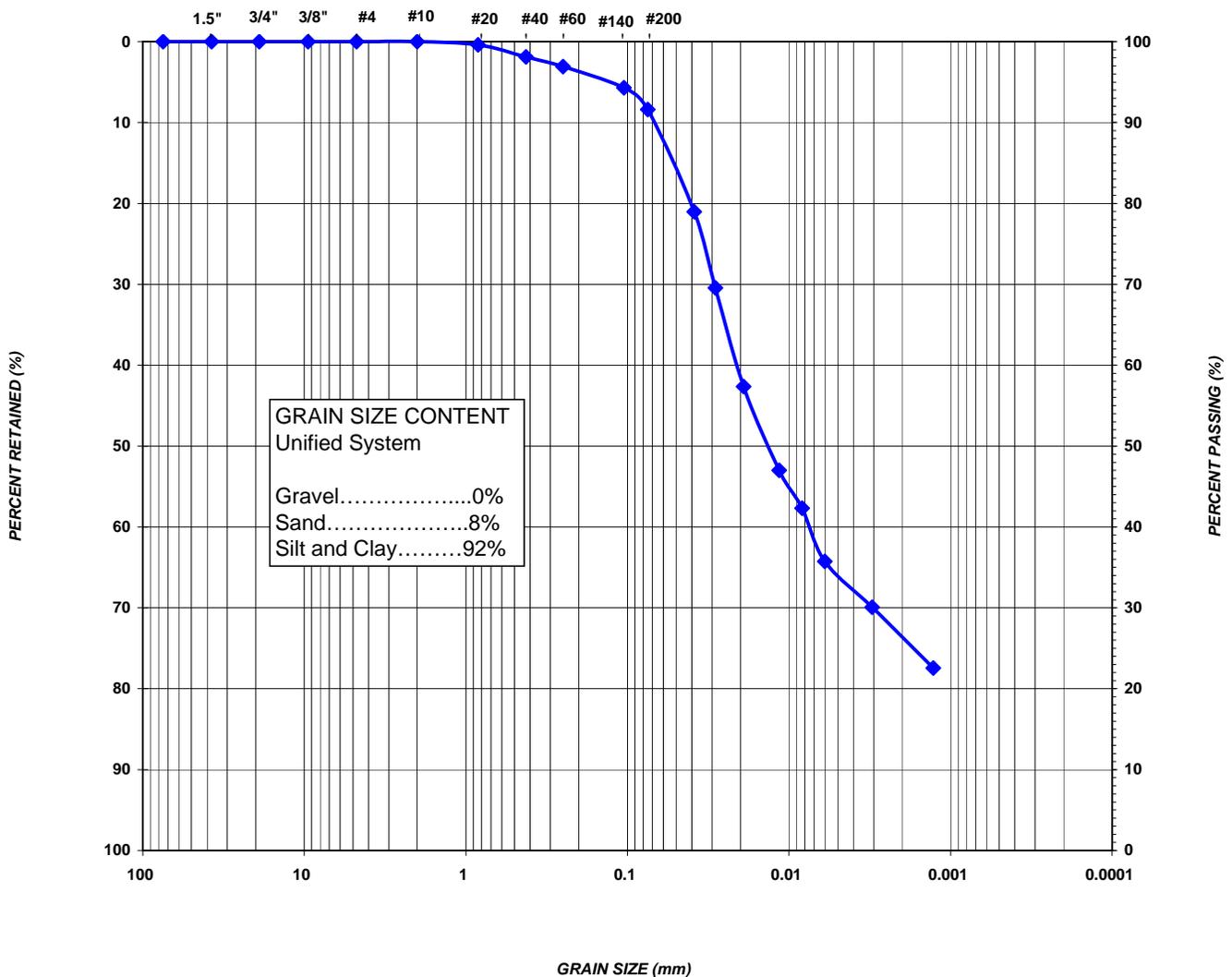
PROJECT: Meaford Subdivision
 LOCATION: Meaford, ON
 CLIENT: Meaford A2A Developments Inc.
 c/o Friedman & Associates

FILE NO.: 31-12-8015
 LAB NO.: 1514b
 SAMPLE DATE: Apr-03-12
 SAMPLED BY: B.H.

BOREHOLE NUMBER: 6 SAMPLE DEPTH: N/G
 SAMPLE NUMBER: 4
 SAMPLE LOCATION: as above
 SAMPLE DESCRIPTION: Clayey silt, trace sand

GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	GRAVEL		COARSE	MEDIUM	FINE	SILT	CLAY
	SAND						
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY	
	GRAVEL		SAND				



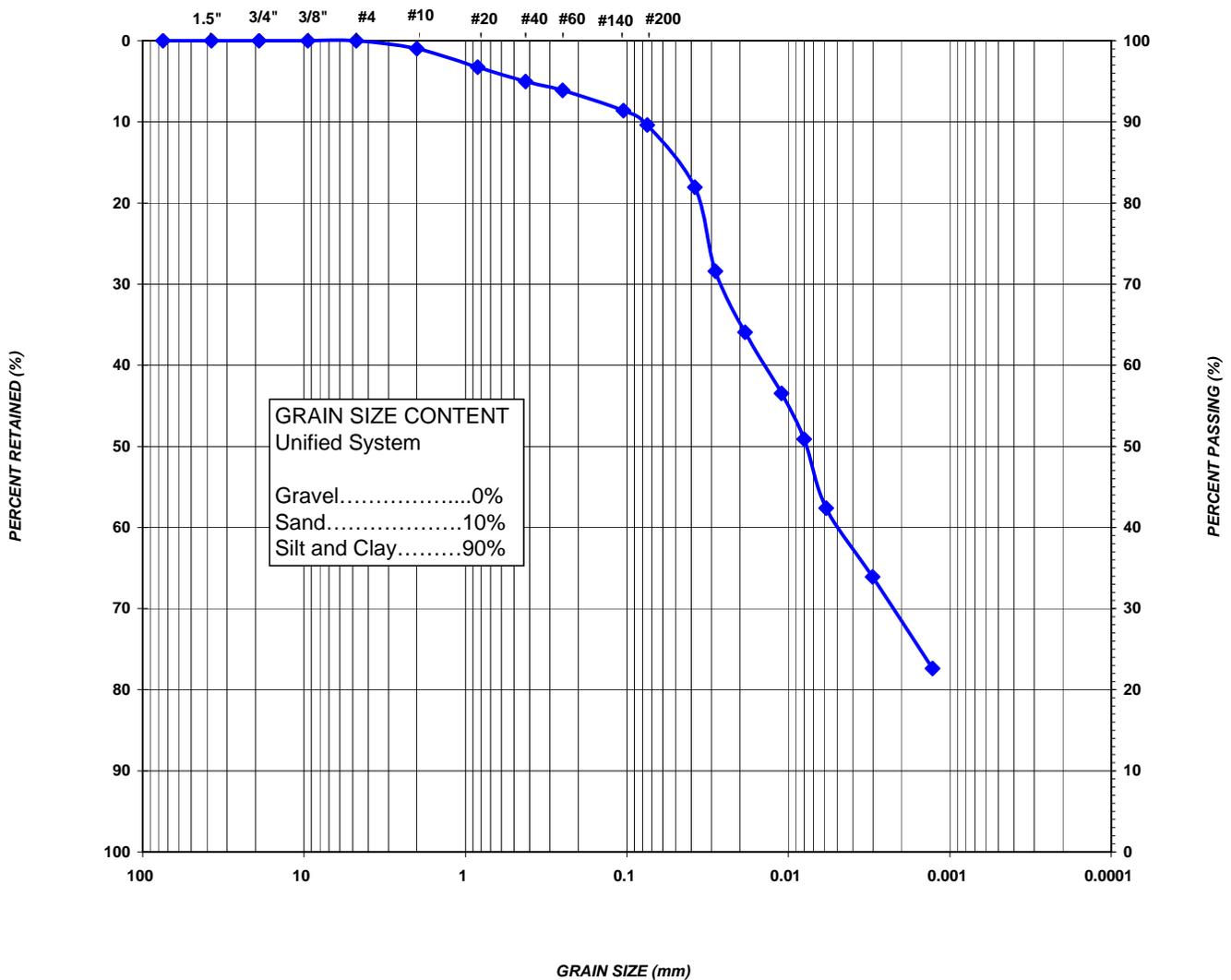
PROJECT: **Meaford Subdivision**
 LOCATION: **Meaford, ON**
 CLIENT: **Meaford A2A Developments Inc.**
c/o Friedman & Associates

FILE NO.: **31-12-8015**
 LAB NO.: **1514c**
 SAMPLE DATE: **Apr-03-12**
 SAMPLED BY: **B.H.**

BOREHOLE NUMBER: **16** SAMPLE DEPTH: **N/G**
 SAMPLE NUMBER: **7**
 SAMPLE LOCATION: **as above**
 SAMPLE DESCRIPTION: **Clayey silt, trace sand**

GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	GRAVEL		COARSE	MEDIUM	FINE	SILT	CLAY
	SAND						
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY	
	GRAVEL		SAND				



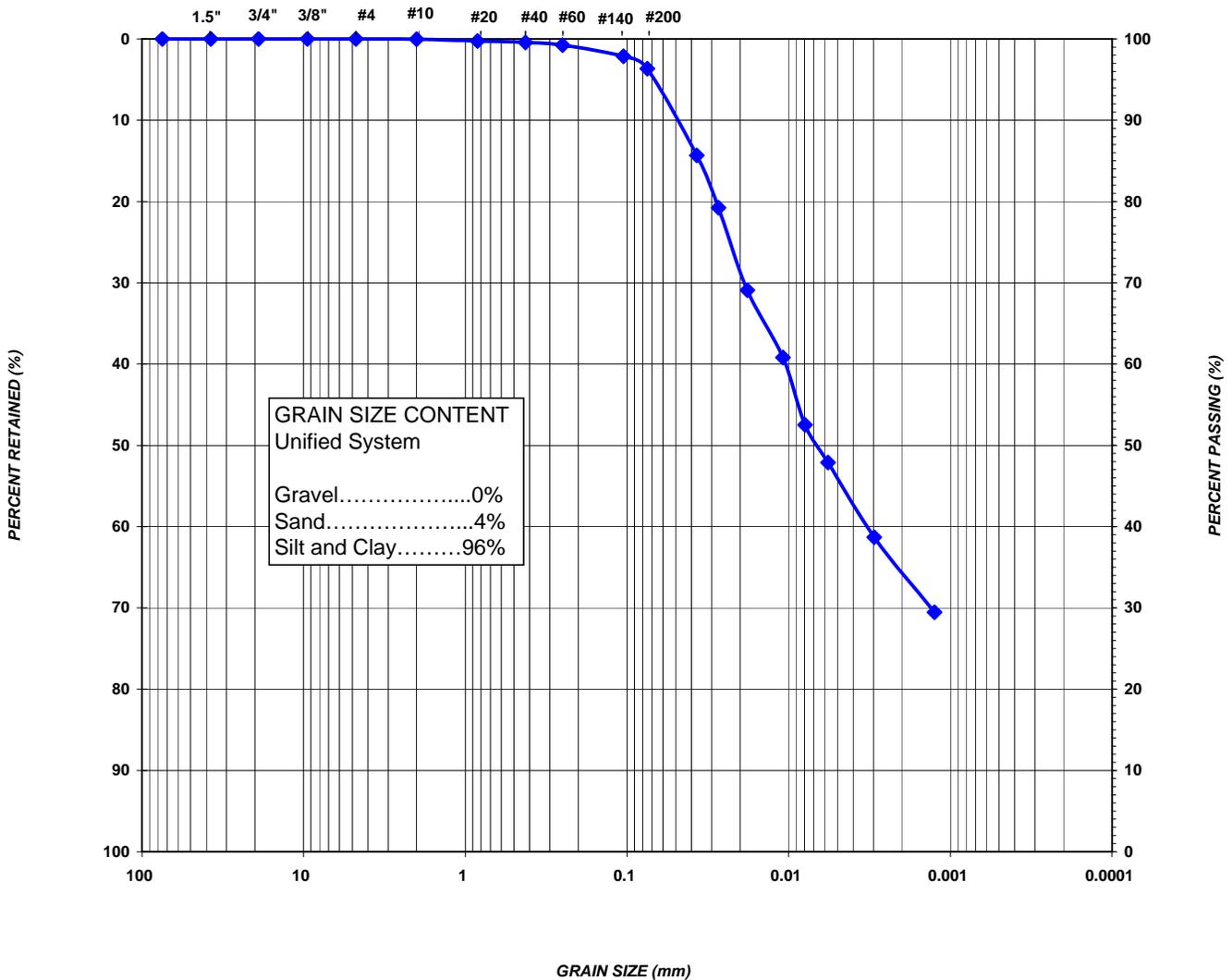
PROJECT: **Meaford Subdivision**
 LOCATION: **Meaford, ON**
 CLIENT: **Meaford A2A Developments Inc.**
c/o Friedman & Associates

FILE NO.: **31-12-8015**
 LAB NO.: **1514d**
 SAMPLE DATE: **Apr-03-12**
 SAMPLED BY: **B.H.**

BOREHOLE NUMBER: **5** SAMPLE DEPTH: **N/G**
 SAMPLE NUMBER: **3**
 SAMPLE LOCATION: **as above**
 SAMPLE DESCRIPTION: **Clayey silt, trace sand**

GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	GRAVEL		COARSE	MEDIUM	FINE	SILT	CLAY
			SAND				
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY	
	GRAVEL		SAND				



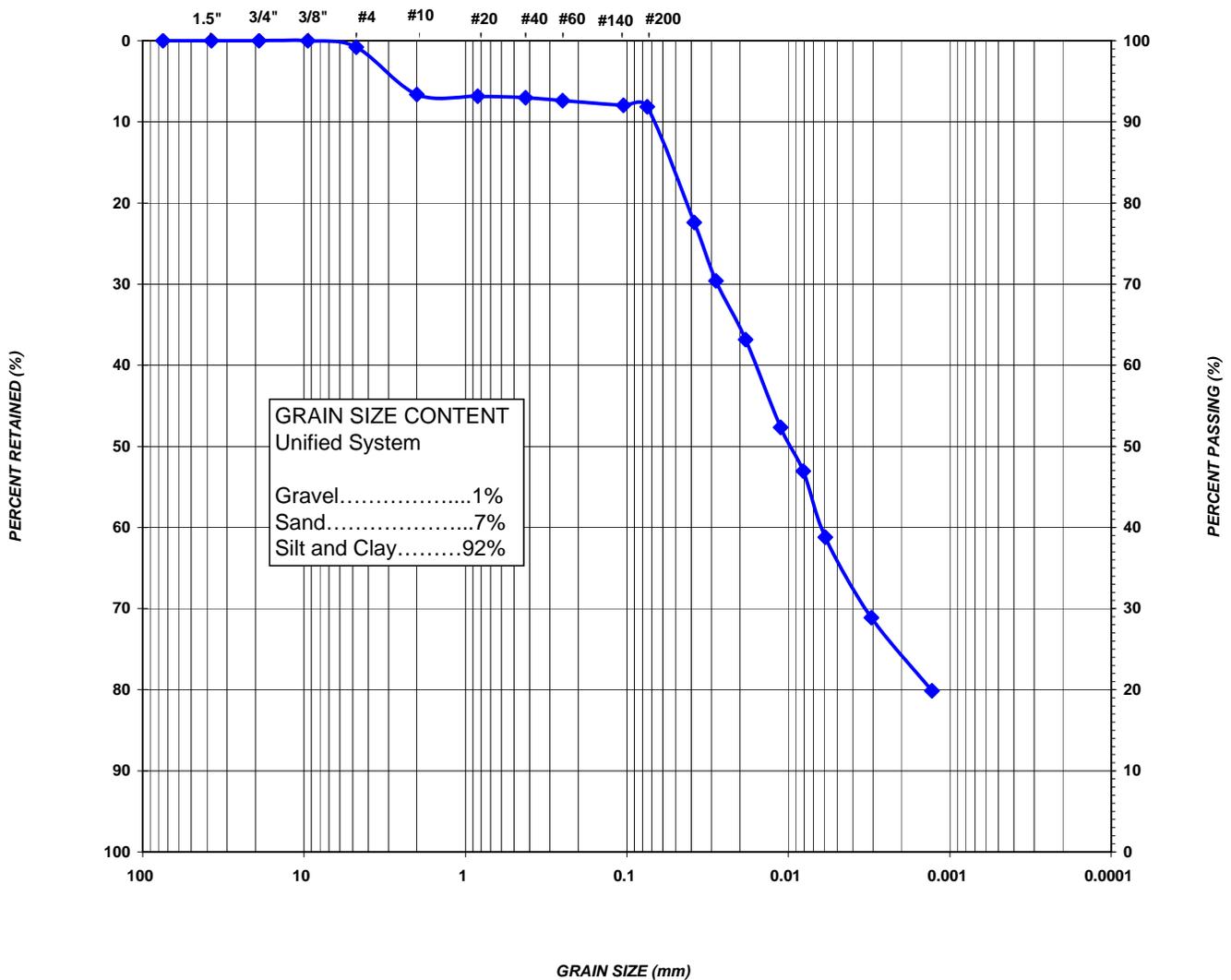
PROJECT: **Meaford Subdivision**
 LOCATION: **Meaford, ON**
 CLIENT: **Meaford A2A Developments Inc.**
c/o Friedman & Associates

FILE NO.: **31-12-8015**
 LAB NO.: **1514e**
 SAMPLE DATE: **Apr-03-12**
 SAMPLED BY: **B.H.**

BOREHOLE NUMBER: **12** SAMPLE DEPTH: **N/G**
 SAMPLE NUMBER: **7**
 SAMPLE LOCATION: **as above**
 SAMPLE DESCRIPTION: **Silt, some clay, trace sand, trace gravel**

GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	GRAVEL		COARSE	MEDIUM	FINE	SILT	CLAY
	SAND						
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY	
	GRAVEL		SAND				



Terraprobe

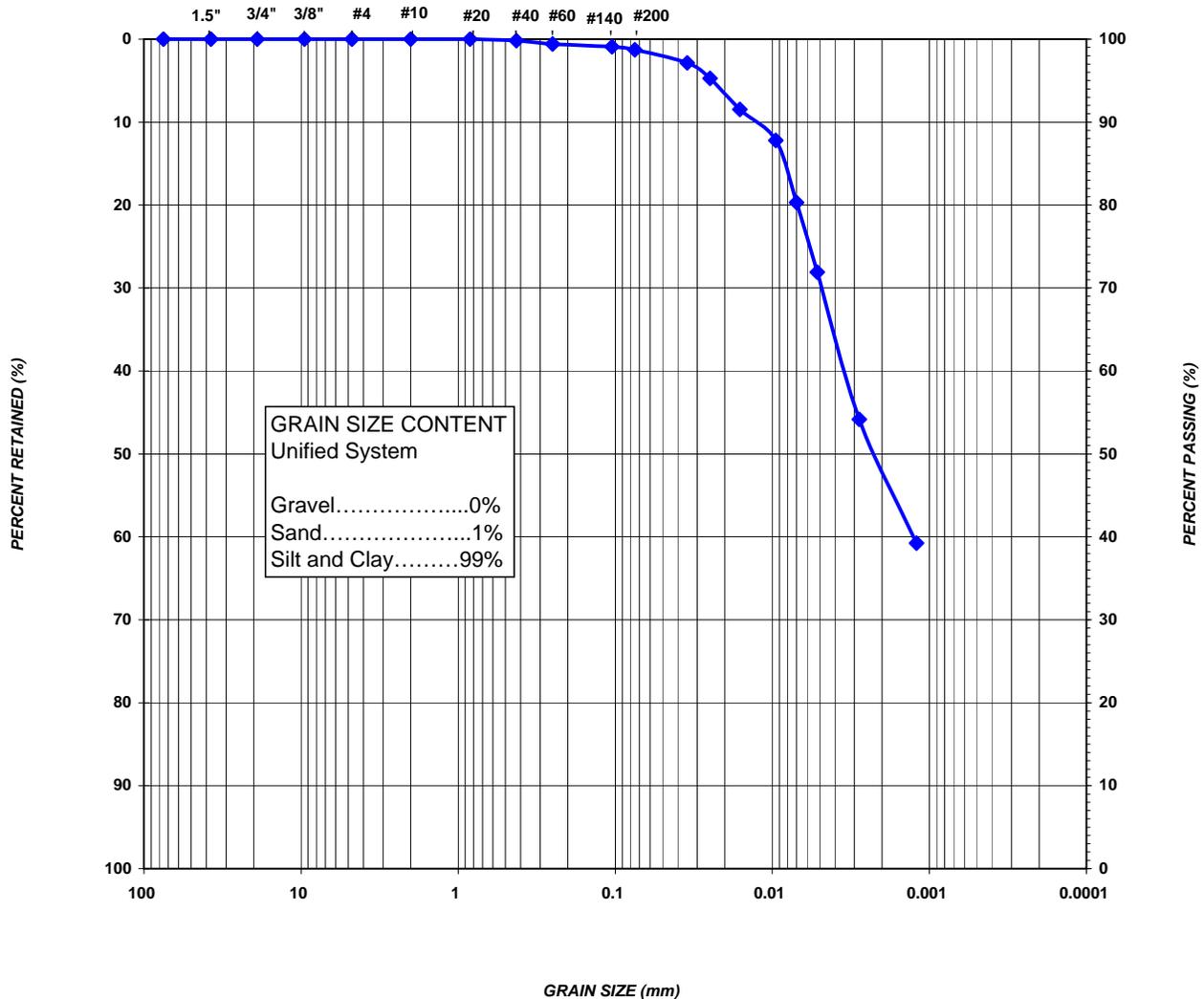
**SIEVE AND HYDROMETER ANALYSIS
TEST REPORT**

PROJECT: **Meaford Subdivision**
LOCATION: **Meaford, ON**
CLIENT: **Meaford A2A Developments Inc.**
c/o Friedman & Associates
BOREHOLE NUMBER: **18** SAMPLE DEPTH: **N/G**
SAMPLE NUMBER: **3**
SAMPLE LOCATION: **as above**
SAMPLE DESCRIPTION: **silt and clay, trace sand**

FILE NO.: **31-12-8015**
LAB NO.: **1514f**
SAMPLE DATE: **Apr-03-12**
SAMPLED BY: **B.H.**

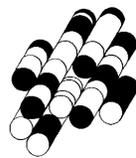
GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES

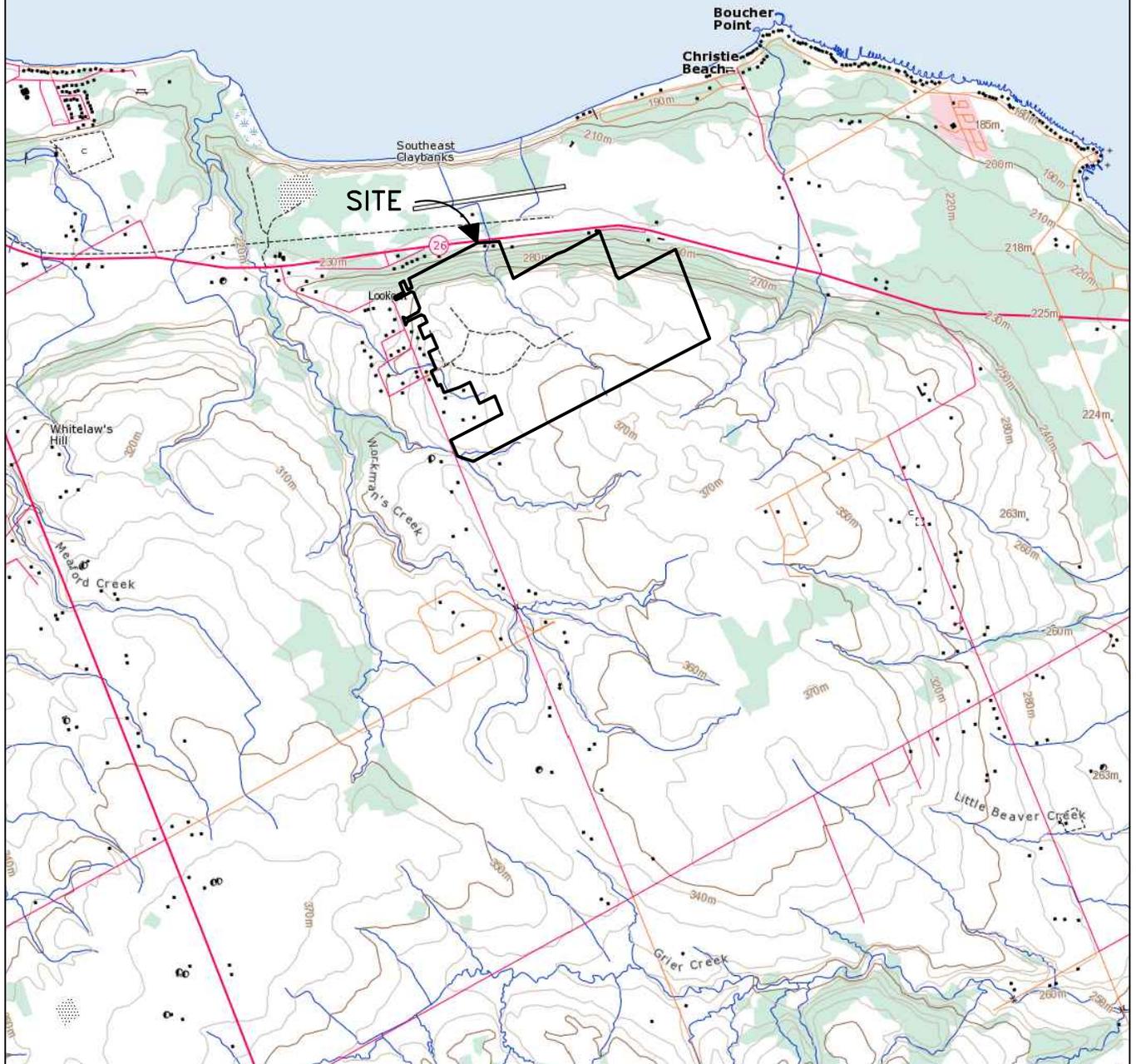


MIT SYSTEM	GRAVEL		COARSE	MEDIUM	FINE	SILT	CLAY
	SAND						
UNIFIED SYSTEM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY	
	GRAVEL		SAND				

FIGURES



Terraprobe Inc.



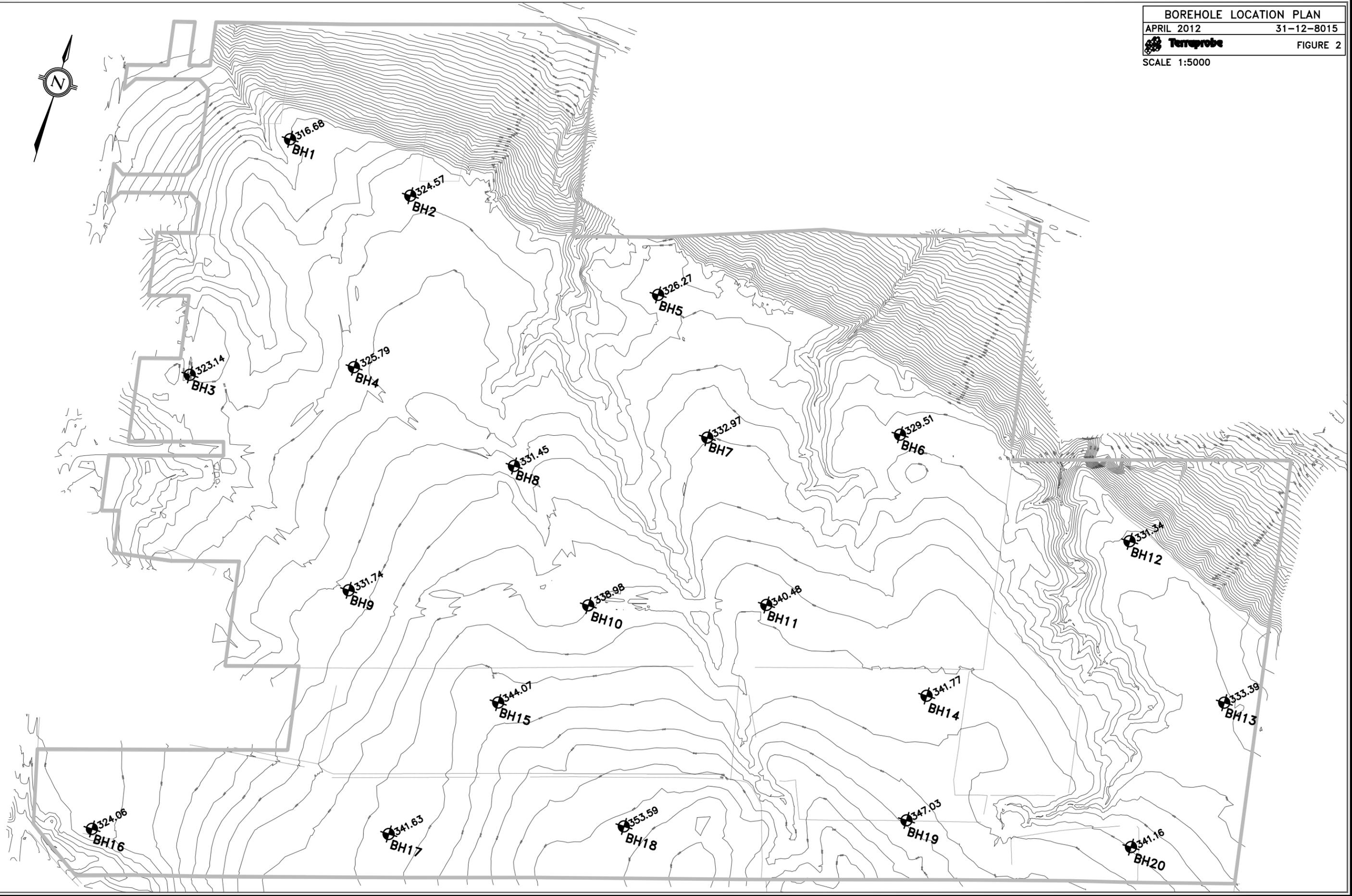
MARCH 2012

SITE LOCATION PLAN

31-12-8015



FIGURE 1





- NOTES:
1. The concept has not been updated based on geotechnical studies, borehole data or hydrogeological information. To be confirmed by a qualified professional.
 2. The concept is based on a Karst Assessment completed by Karst Solutions.
 3. Concept boundaries and topographic information is based on surveys completed by JD Barnes & Associates.
 4. The concept has not been updated with results of any field work and/or environmental analysis completed by Beacon Environmental in Spring of 2012.
 5. Top-of-bank and other environmental constraints boundaries have not been confirmed.
 6. Environmental Area boundaries are based on Beacon Environmental Preliminary Environmental Constraints Mapping dated November 2010 and include medium and high constraint areas.
 7. Stormwater management pond location and sizing is based on the servicing information prepared by Cole Engineering, dated April 2012.
 8. Proposed water supply and sanitary methods are based on servicing information prepared by Cole Engineering, dated April 2012.
 9. Permits will be obtained for development on lands that fall within the Regulated Areas of GSCA under O.Reg. 151/06. Based on Environmental Impact Study prepared by Beacon Environmental.
 10. Existing Right-of-way width is assumed to be twice the distance from property line to hard surface centerline as shown on the topographic survey.
 11. Areas are approximate between different land uses.

Topo information from survey by J. D. Barnes OLS., dated Nov 4, 2011

NOT TO SCALE.

DEVELOPMENT CONCEPT
MEAFORD HIGHLANDS RESORT
 LOTS 9 & 10 3RD LINE
 MEAFORD
 COUNTY OF GREY



DEVELOPMENT STATISTICS

RESORT	
Meaford Highlands Inn and Villas	16.53 ha
Spa / Retail/ Aquatic & Wellness Centre	
Golf Course and Club House	19.37 ha
RESORT RESIDENTIAL	
Low Density Resort Residential	21.57 ha
Resort Residential	24.26 ha
Roads	18.79 ha
Environmental Area	40.42 ha
Open Space / Buffer / Trail	1.76 ha
Park	5.14 ha
Storm Water Management	6.06 ha
TOTAL SITE AREA	153.90 ha

ROAD LENGTH

26m ROW:	985 m
20m ROW:	3,295 m
18m ROW:	4,560 m
14m ROW:	540 m

LEGEND

- Property Boundary
- Meaford Highlands Resort and Villas
- Low Density Resort Residential (21m)
- Low Density Resort Residential (18.3m)
- Resort Residential Single Family (15.2m)
- Resort Residential Single Family (12.2m)
- Resort Residential Semi Detached (9m)
- Resort Residential Townhomes(7m)
- Resort Golf Course
- Environmental - High Constraint Area
Source: Beacon Environmental, Nov. 2010
- Environmental - Medium Constraint Area
Source: Beacon Environmental, Nov. 2010
- Park / Parkette
- Trail block / Buffer
- Storm Water Management

REVISIONS LIST

2012 APR 11	REVISE NW SWMP, REMOVE CUL-DE-SAC, REMOVE N SWMP.
2012 APR 5	REVISE LOCATION OF AMPHITHEATRE

WESTON CONSULTING GROUP INC.
 Vaughan Office: 201 Midway Avenue, Unit 19, Vaughan, Ontario L4K 9S8
 Phone: (905) 738-8080
 1-800-363-3558 Fax: (905) 738-8637 www.westonconsulting.com
 Oakville Office: 1660 North Service Road E., Suite 114, Oakville, Ontario L6H 7C3
 Phone: (905) 844-8745

File Number: 5305-1	Drawing Number: C10
Date Drawn: 2012 MAR 27	
Drawn By: SB	
Planner: RC	
Scale: see scale bar	
CAD: 5305-1/concepts/C10rev for sub Apr 26, 12.dgn	

MAY 2012

DEVELOPMENT CONCEPT PLAN

31-12-8015



FIGURE 3